Space Weather Forecast

Issued on Monday, 12 February 2024 at 01:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME arrivals possible from late 12 Feb until early 14 Feb (day 1-3), with G1 Minor Storm intervals likely and a chance of G2 Moderate Storms. M-flares likely.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with one Moderate flare observed from over the northeast limb at 11/2245 UTC. A number of common flares were also observed, primarily from large region located in the southwest quadrant, but also from a developing region in the northeast disc and a further developing region in the north-centre disc. The large region has been losing small spots as it matures, although a small opposite polarity spot has emerged to the north of the main leader spot, maintaining this region's complexity. The northeast developing region saw the most notable growth while the other region had some small spots emerge to its north. There are eight regions currently on the disc, however all other regions are smaller and simpler. Two further regions are expected to soon rotate into view from the eastern solar horizon.

A couple of CME's (coronal mass ejections) were observed, however these were all off the Earth-Sun line.

Solar Wind / Geomagnetic Activity: Solar winds showed the arrival of a CME at 11/0121 UTC, with the observed speeds suddenly rising from background slow wind conditions of 370 km/s to be slightly elevated at 450km/s. A more gradual rise then occurred through the period, reaching elevated speeds of 550-600km/s by the end of the period. Interplanetary Magnetic Field suddenly rose to be strong after 11/0122 UTC, then eased again at 11/0326 UTC to be Moderate, before easing to weak from 11/0600 UTC. The north-south component became Moderate after 11/0122 UTC but variable in direction, before gradually easing along with the total field strength. Geomagnetic activity was Quiet to Active (Kp 1-4) with the strongest (Kp4) activity occurring 11/0000-0300 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) was initially at S1 Minor Radiation Storm levels, but rose to S2 Moderate Radiation storm levels between 11/0210-0350 UTC, but then eased gradually through the period, falling below the S1 Minor Radiation Storm level at 11/1805 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity likely to persist with further Moderate flares, and a slight chance of Strong flares. These perhaps most likely from the large region in the southwest, but with an increasing potential from the other developing regions, along with new regions moving onto eastern disc.

Solar Wind / Geomagnetic Activity: Multiple CME arrivals are possible day 1-2 (12-13 Feb) with ongoing effects likely day 3 (14 Feb), Otherwise current elevated winds are likely to gradually ease day 1 (12 Feb), before any CME enhancements ease occur. Any enhanced solar wind environment then easing day 4 (15 Feb). Mainly Quiet geomagnetic conditions at first are likely to become Active with a chance of G1 Minor Storms day 1, and likely rising to G1 Minor Storm with a chance G2 Moderate Storms day 2 (12-13 Feb). These conditions continuing day 3

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(14 Feb) before easing to mainly Quiet day 4 (15 Deb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) is expected to be above background, but easing through the period. There is a slight chance of further rises above the S1 Minor Radiation storm level, mainly day 1 or day 2 (12-13 Feb) from any CME arrival, or any further notable flares.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	25	60	40	1
Strong	G3	No	5	15	10	1
Severe	G4	No	1	2	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	75	75	75
Very Active	R3 to R5 X	No	15	15	15	15

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	30	20	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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